Specifications for Optical Tracking System

I General

The Naval Research Laboratory desires to procure an optics system mounted on a high power precision radar antenna. The optics are used in conjunction with various aspects of radar operation: a. Visual acquisition of targets, b. Closed loop optical tracking of targets, c. Visual identification of targets imaged with the radar, and d. Calibration of pedestal position using stars. Two separate optic systems are needed, a wide field system for initial acquisition and area monitoring and a narrow field system for tracking, visual identification and star calibration. Both systems will include the optics and a video camera in a weatherproof enclosure and a remotely located control panel with a small flat monitor.

The optics and video cameras need to be mounted on the radar pedestal and are continually exposed to varying outdoor conditions. The ambient air temperature range and the operating range is from -10°F to 110°F and the systems are exposed to direct sunlight.

The total weight of the optics cameras and enclosure is to not exceed 100 lb. The maximum length of the enclosure shall be less than 50". The height shall not exceed 12" and the width shall not exceed 16 ".

The system will be powered from standard 120 V 60Hz supply. Any DC power supplies required for the optics and video cameras shall be provided in the contract.

II Optics

Narrow field.
Clear aperture: greater than 150 mm
Focal length: zoom includes the range of 400 mm to 2500 mm minimum

Wide field
Clear aperture: grater than 100 mm
Focal length: zoom includes the range of 50 mm to 300 mm minimum

Both systems will have the following additional specifications:

Boresight accuracy: boresight is maintained over the full zoom range to within +/- 30 arc seconds
Mounting system: The optics and the camera will be mounted such that there is a means to align the optics with the radar beam. There shall be a minimum of 4 degrees of alignment capability in both azimuth and elevation.

Electronic reticle: There shall be an operator selectable illuminated projected reticle that defines the center of the optical ray-path
Filter system: There shall be a means to adjust the light intensity by means of neutral density filters so that the full optical aperture is not affected. The range of adjustment shall be at least 0 to 4.
Remote control: Remote control shall be provided via an operator control panel and a selectable RS232 interface port. The functions to be controlled and read out shall include: focus from 1000 ft. to infinity, zoom range, neutral density filter setting, and the reticle. There shall be limit stops in the zoom and focus motors to prevent over travel.

III Video cameras

Two color video cameras shall be provided and integrated within the optics package. Each camera shall have two video outputs. One for the monitor and the second for an optical tracking system. The optical tracking system requires a composite video RS170, NTSC 60 Hz output with a BNC connector.

Sensing area: 6.4x4.8mm minimum (½" format)
Sensitivity: 1 lux minimum
Remote control: The electronic shutter shall be switch controllable and located on the lens control panel. If the camera has RS232 control capabilities that connecter shall be located on the control panel.

IV Video monitors

Two color LCD monitors shall be provided to display the video camera outputs. Suitable units are those like the Marshal VR-82 or SONY LM-1024R

Size: the diagonal dimension of each monitor shall be between 7.9 and 10.5 "
Video input: NTSC